AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method of processing an input image to obtain an output image, the input image being formed from input pixels having ~~brightness~~ intensity levels, the method comprising ~~the steps of~~:

(a) detecting pixel-to-pixel variations in the ~~brightness~~ intensity levels in at least one direction in the input image, thereby generating high spatial frequency information~~and a variable zoom ratio~~;

determining a localized zoom ratio based on the high spatial frequency information of local input pixels;

(b) setting interpolation points with spacing between the interpolation points varying according to the localized zoom ratio ~~the high spatial frequency information and the variable zoom ratio~~; and

(c) generating output pixels from the input pixels by interpolation at the interpolation points.

2. (Currently Amended) The method of claim 1, wherein said step (b) assigns a basic value to said spacing in parts of the image

in which the ~~brightness~~ intensity level of the input pixels is uniform, divides each portion of the image in which the ~~brightness~~ intensity levels of the input pixels vary into a first part and a second part, reduces said spacing to less than the basic value in the first part, and increases said spacing to more than the basic value in the second part.

3. (Currently Amended) The method of claim 1, wherein said step (b) assigns a basic value to said spacing in parts of the image in which the ~~brightness~~ intensity level of the input pixels is uniform, divides each portion of the image in which the ~~brightness~~ intensity levels of the input pixels vary into a first part, a second part, and a third part, reduces said spacing to less than the basic value in the first part and the third part, and increases said spacing to more than the basic value in the second part.

4. (Currently Amended) The method of claim 1, wherein said step (a) includes calculating a first derivative of the ~~brightness~~ intensity levels in said one direction.

5. (Currently Amended) The method of claim 4, wherein said step (a) includes calculating a second derivative of the ~~brightness~~ intensity levels in said one direction.

6. (Currently Amended) The method of claim 4, wherein said step (a) includes calculating a third derivative of the ~~brightness~~ intensity levels in said one direction.

7. (Original) The method of claim 4, wherein said step (a) includes performing a spatial filtering operation to obtain a certain spatial frequency component of the image.

8. (Canceled)

9. (Currently Amended) The method of claim 1, wherein said step (a) includes detecting patterns of variation in the ~~brightness~~ intensity levels of the input pixels.

10. (Currently Amended) The method of claim 9, wherein said patterns describe polarities of the pixel-to-pixel variations in the ~~brightness~~ intensity levels of the input pixels.

11. (Currently Amended) The method of claim 10, wherein said patterns also describe magnitudes of the pixel-to-pixel variations in the ~~brightness~~ intensity levels of the input pixels.

12. (Currently Amended) The method of claim 9, wherein said patterns describe changes in the ~~brightness~~ intensity levels of three consecutive pixels among the input pixels.

13. (Currently Amended) The method of claim 9, wherein said patterns describe changes in the ~~brightness~~ intensity levels of five consecutive pixels among the input pixels.

14. (Original) A machine-readable storage medium storing a machine-executable program for processing an image by the method of claim 1.

15. (Currently Amended) An image-processing apparatus for processing an image formed from input pixels having ~~brightness~~ intensity levels to obtain an output image, comprising:

a first processing unit for detecting pixel-to-pixel variations in said ~~brightness~~ intensity levels in at least one direction in the image, thereby generating high spatial frequency

information ~~and a variable zoom ratio~~,

said first processing unit determining a localized zoom ratio based on the high spatial frequency information of local input pixels;

a second processing unit coupled to the first processing unit, for setting interpolation points with spacing between the interpolation points varying according to the localized zoom ratio ~~high spatial frequency information and the variable zoom ratio~~; and

a third processing unit coupled to the second processing unit, for generating output pixels from the input pixels by interpolation at the interpolation points.

16. (Currently Amended) The image-processing apparatus claim 15, wherein the second processing unit assigns a basic value to said spacing in parts of the image in which the ~~brightness~~ intensity levels of the input pixels is uniform, divides each portion of the image in which the ~~brightness~~ intensity levels of the input pixels vary into a first part and a second part, reduces said spacing to less than the basic value in the first part, and increases said spacing to more than the basic value in the second part.

17. (Currently Amended) The image-processing apparatus claim 15, wherein the second processing unit assigns a basic value to said spacing in parts of the image in which the ~~brightness~~ intensity levels of the input pixels is uniform, divides each portion of the image in which the ~~brightness~~ intensity levels of the input pixels vary into a first part, a second part, and a third part, reduces said spacing to less than the basic value in the first part and the third part, and increases the spacing to more than the basic value in the second part.

18. (Currently Amended) An image display apparatus for displaying an image formed from input pixels having ~~brightness~~ intensity levels, comprising:

a memory unit for storing the ~~brightness~~ intensity levels of the input pixels;

a first processing unit coupled to the memory unit, for detecting pixel-to-pixel variations in said ~~brightness~~ intensity levels in at least one direction in the image, thereby generating high spatial frequency information ~~and a variable zoom ratio~~,

said first processing unit determining a localized zoom ratio based on the high spatial frequency information of local input pixels;

a second processing unit coupled to the first processing

unit, for calculating interpolation points with spacing between the interpolation points varying according to the localized zoom ratio ~~high spatial frequency information and the variable zoom ratio~~;

a third processing unit coupled to the second processing unit, for generating output pixels from the input pixels by interpolation at the interpolation points; and

a display unit coupled to the third processing unit, for displaying the output pixels.

19. (Currently Amended) The image display apparatus of claim 18, wherein the second processing unit assigns a basic value to said spacing in parts of the image in which the ~~brightness~~ intensity levels of the input pixels is uniform, divides each portion of the image in which the ~~brightness~~ intensity levels of the input pixels vary into a first part and a second part, reduces said spacing to less than the basic value in the first part, and increases said spacing to more than the basic value in the second part.

20. (Currently Amended) The image display apparatus of claim 18, wherein the second processing unit assigns a basic value to said spacing in parts of the image in which the ~~brightness~~ intensity levels of the input pixels is uniform, divides each portion of the image in which the ~~brightness~~ intensity levels of the input pixels vary into a first part, a second part, and a third part, reduces said spacing to less than the basic value in the first part and the third part, and increases the spacing to more than the basic value in the second part.

21. (New) The method of claim 1, wherein the pixel intensities represent brightness, luminance, or a color component.

22. (New) The image processing apparatus of claim 15, wherein the pixel intensities represent brightness, luminance, or a color component.

23. (New) The image display apparatus of claim 18, wherein the pixel intensities represent brightness, luminance, or a color component.

24. (New) A method for processing an input image having input pixels to generate an output image having output pixels, comprising:

detecting variations of intensity between at least two input pixels of an image to generate localized high spatial frequency information;

determining a localized zoom ratio based on the high spatial frequency information of local input pixels;

determining localized inter-pixel spacing values between interpolation points based on the localized zoom ratio; and

generating the output pixels from the input pixels by interpolation at the interpolation points.

25. (New) The method of claim 24, wherein the pixel intensities represent brightness, luminance, or a color component.

26. (New) A method of processing an input image to obtain an output image, the input image being formed from input pixels having intensity levels, the method comprising:

(a) detecting pixel-to-pixel variations in the intensity levels in at least one direction in the input image, thereby generating local pixel variation patterns;

(b) determining a localized zoom ratio based on the local pixel variation patterns;

(c) setting interpolation points with spacing between the interpolation points varying based on the localized zoom ratio; and

(d) generating output pixels from the input pixel by interpolation at the interpolating points.

27. (New) The method of claim 26, said determining step increasing the localized zoom ratio when the local pixel variations correspond to a leading edge segment.

28. (New) The method of claim 26, said determining step decreasing the localized zoom ratio when the local pixel variations correspond to a trailing edge segment.

29. (New) The method of claim 26, said setting step setting interpolation points with spacing between the interpolation points varying based on the localized zoom ratio and a basic zoom ratio.

30. (New) The method of claim 29, said determining step setting the localized zoom ratio to zero when the local pixel variations correspond to a same type, increase or decrease, of variation between a first two pixels as between a second two pixels of a local pixel group.

31. (New) The method of claim 29, said determining step setting the localized zoom ratio to zero when the local pixel variations correspond to a different type, increase or decrease, of variation between a first two pixels as between a second two pixels of a local pixel group.

31. (New) The method of claim 29, said determining step setting the localized zoom ratio to zero when the local pixel variations do not exceed a threshold value.

32. (New) The method of claim 29, said detecting step detecting pixel-to-pixel variations in the intensity levels between at least 3 pixels.

33. (New) The method of claim 29, wherein n is the basic zoom ratio and α is the localized zoom ratio which satisfy the following equation $0<\alpha<n$.

34. (New) A machine-readable storage medium storing a machine-executable program for processing an image by the method of claim 29.

35. (New) A method of processing an input image to obtain an output image, the input image being formed from input pixels having intensity levels, the method comprising:

(a) detecting pixel-to-pixel variations in polarity and magnitude of the intensity levels in at least one direction in the input image, thereby generating local pixel variation patterns;

(b) determining a localized zoom ratio α based on the polarity of local pixel variation patterns;

(c) determining a further quantity β based on the magnitude of local pixel variation patterns;

(d) setting interpolation points with spacing between the interpolation points varying based on the localized zoom ratio α and the further quantity β; and

(e) generating output pixels from the input pixel by interpolation at the interpolating points.

36. (New) The method of claim 35, said determining steps b) and c) increasing the localized zoom ratio α and setting the further quantity β to zero when the local pixel variations correspond to a gentle leading edge segment.

37. (New) The method of claim 35, said determining steps b) and c) decreasing the localized zoom ratio α and setting the further quantity β to zero when the local pixel variations correspond to a gentle trailing edge segment.

38. (New) The method of claim 35, said determining steps b) and c) increasing the localized zoom ratio α and increasing the further quantity β when the local pixel variations correspond to a sharp leading edge segment.

39. (New) The method of claim 35, said determining steps b) and c) decreasing the localized zoom ratio α and decreasing the further quantity β when the local pixel variations correspond to a sharp trailing edge segment.

40. (New) The method of claim 35, said setting step setting interpolation points with spacing between the interpolation points varying based on the localized zoom ratio α, the further quantity β and a basic zoom ratio n.

41. (New) The method of claim 40, said determining steps b) and c) setting the localized zoom ratio α to zero and the further quantity β to zero when the local pixel variations correspond to a same type, increase or decrease, and a substantially same magnitude of variation between a first two pixels as between a second two pixels of a local pixel group.

42. (New) The method of claim 40, said determining steps b) and c) setting the localized zoom ratio α to zero and the further quantity β to zero when the local pixel variations correspond to a different type, increase or decrease, and a substantially same magnitude of variation between a first two pixels as between a second two pixels of a local pixel group.

43. (New) The method of claim 40, said determining steps b) and c) setting the localized zoom ratio α to zero and the further quantity β to zero when the local pixel variations do not exceed a threshold value.

44. (New) The method of claim 35, wherein n, α, and β satisfy the following equation $n-\alpha-ABS(\beta)>0$.

45. (New) A machine-readable storage medium storing a machine-executable program for processing an image by the method of claim 34.

46. (New) A method of processing an input image to obtain an output image, the input image being formed from input pixels having intensity levels, the method comprising:

(a) detecting pixel-to-pixel variations in polarity and magnitude of the intensity levels of five contiguous pixels in at least one direction in the input image, thereby generating local pixel variation patterns;

(b) determining a localized zoom ratio α based on the polarity of local pixel variation patterns;

(c) determining a further quantity γ based on the magnitude of local pixel variation patterns;

(d) setting interpolation points with spacing between the interpolation points varying based on the localized zoom ratio α and the further quantity γ; and

(e) generating output pixels from the input pixel by interpolation at the interpolating points.

47. (New) The method of claim 46,

wherein the five contiguous pixels include a first pixel, a second pixel, a third pixel, a fourth pixel and a fifth pixel,

said determining steps b) and c) increasing the localized zoom ratio α and setting the further quantity γ to zero when there is no substantial variation between the second and third pixels, a substantial variation between the third and fourth pixels, an no substantial variation between the fourth and fifth pixels.

48. (New) The method of claim 46,

wherein the five contiguous pixels include a first pixel, a second pixel, a third pixel, a fourth pixel and a fifth pixel,

said determining steps b) and c) increasing the localized zoom ratio α and increasing the further quantity γ when there is no substantial variation between the second and third pixels, a substantial variation between the third and fourth pixels of a first polarity, and a substantial variation between the fourth and fifth pixels of the first polarity.

49. (New) The method of claim 46,

wherein the five contiguous pixels include a first pixel, a second pixel, a third pixel, a fourth pixel and a fifth pixel,

said determining steps b) and c) decreasing the localized zoom ratio α and setting the further quantity γ to zero when there is no substantial variation between the third and fourth pixels, a substantial variation between the second and third pixels of a first polarity, and either a substantial variation between the first and second pixels having a second polarity or no substantial variation between the first and second pixels.

50. (New) The method of claim 46,

wherein the five contiguous pixels include a first pixel, a second pixel, a third pixel, a fourth pixel and a fifth pixel,

said determining steps b) and c) decreasing the localized zoom ratio α and decreasing the further quantity γ when there is a substantial variation between the first and second pixels of a first polarity, a substantial variation between the second and third pixels of the first polarity, and no substantial variation between the third and fourth pixels.

51. (New) The method of claim 46, said setting step setting interpolation points with spacing between the interpolation points varying based on the localized zoom ratio α, the further quantity γ and a basic zoom ratio n.

52. (New) The method of claim 51,

wherein the five contiguous pixels include a first pixel, a second pixel, a third pixel, a fourth pixel and a fifth pixel,

said determining steps b) and c) setting the localized zoom ratio α to zero and setting the further quantity γ to zero when there is a substantial variation between the second and third pixels of a first polarity, and a substantial variation between

the third and fourth pixels of either the first or second polarity.

53. (New) The method of claim 51, said determining steps b) and c) setting the localized zoom ratio α to zero and the further quantity γ to zero when the variations between the second and third pixels and the variations between the third and fourth pixels do not exceed a threshold value.

54. (New) The method of claim 46, wherein n, α and γ satisfy the following equation $n-\alpha-ABS(\gamma)>0$

55. (New) A machine-readable storage medium storing a machine-executable program for processing an image by the method of claim 46.